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10/807,716	03/24/2004	Ian M. Davis	013098/GNRL/HMM	3729

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EXAMINER

SMITH, FRANCIS P

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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11/20/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/807,716	Applicant(s) DAVIS ET AL.	
	Examiner Francis P. Smith	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/27/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 27, 2008 has been entered.

Amendment to claim 1 and cancellation of claim 22 is acknowledged. Claims 1-21 and 23 are currently pending and examined on the merits.

Claim Rejections - 35 USC § 102/103

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 9-14, 16-19 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Gorczyca et al. (US 2002/0094686 A1).

Gorczyca teaches treating the surface of a semiconductor article such that the surface is treated to render said surface less prone to cracking and to extend the useful life of the article comprising:

roughening a surface of the substrate, wherein the roughening produces microfissures therein ([0017], [0018], and lines 2-4 of [0022]);

treating the roughened surface with a strong acid ([0022], [0028]); and

applying a silicon coating which is then converted to silicon oxide onto the roughened surface, wherein applying a coating composition onto the roughened surface includes filling and covering the microfissures (e.g. a dielectric coating composition containing at least one metal oxide) ([0023], [0034]).

In the alternative, it would have been obvious to one having ordinary skill in the art at the time of the invention to apply the silicon oxide layer directly, thereby saving time and processing costs associated with the extra conversion step from silicon to silicon oxide.

Regarding claim 2, Gorczyca teaches a quartz substrate [0014].

For claim 3, the use of silicon dioxide is disclosed (a dielectric coating as per claim 22) ([0002], [0023], [0034]).

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As for claims 9 and 10, the quartz article is roughened by sand blasting using abrasive material with size ranges between 1-800 microns, and thus, would inherently produce a surface roughness within the claimed range of 180-320 and 200-300 micro inch Ra [0018].

Claims 11-14, the roughened surface is treated with a strong acid comprising immersing the substrate in an immersion bath comprising a strong acid (hydrofluoric acid) at a concentration of >0-70 volume percent (i.e. within the claimed range of 15-50 and 25-35 volume percent) [0028].

Addressing claims 16 and 17, micro cracks caused by mechanically roughening which appear as breaks in the quartz glassy structure propagating from the treated surface into the quartz for distances up to 200 micrometers (i.e. the depth of the microfissures is up to about 0.005 inch and 0.006 inch) [0022].

Regarding claim 23, the surface of a quartz substrate is roughened (i.e. microparticles of the substrate material are inherently left on the roughened surface), said roughened surface is subsequently treated with a strong acid whereby at least some of the microparticles of the substrate material are removed from the roughened surface.

For claims 18 and 19, Gorczyca teaches forming micro cracks in the surface of quartz substrates at a depth of about 0.0078 inch, which is subsequently filled using silicon dioxide ([0022], [0023], [0034]). Therefore, the applied coating will inherently have a thickness with in the claimed range of up to 0.010 and 0.003 inch.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorczyca et al. (US 2002/0094686 A1) as applied to claim 3, in view of Choi (US 6,833,279 B2).

Regarding claims 4 and 15, Gorczyca teaches applying a metal oxide coating composition onto the roughened surface, but does not expressly teach applying a coating to the roughened surface with a composition comprising zirconium oxide and yttrium oxide.

Choi teaches a method of fabricating and repairing ceramic components for use in semiconductor fabrication. Specifically, Choi teaches yttrium oxide layer (i.e. a dielectric coating) deposited on a roughened ceramic surface. The layer is deposited via a plasma spray process, which is necessarily provided by a plasma generating gas whereby the plasma spray is directed toward the roughened surface in order to apply said layer to said roughened surface (col. 3, line 38-col. 4, line 26). Gorczyca and Choi are analogous art because they are from the same field of endeavor: preparing/repairing components for subsequent semiconductor processing steps. Therefore, one having ordinary skill in the art at the time of the invention would have looked to Choi to deposit a yttrium oxide layer on the semiconductor surface in lieu of

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silicon dioxide in Gorczyca's method in order to cover the micro cracks/fissures with the reasonable expectation of success.

8. Claims 5-8, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorczyca et al. (US 2002/0094686 A1) in view of Kowalsky et al. (US 6,861,101 B1) and in further view of Choi (US 6,833,279 B2).

Gorczyca discloses applying a coating composition to a roughened surface, but does not expressly teach applying a coating composition by generating a plasma spray.

Kowalsky teaches a method whereby particles of metals, ceramics, or mixtures thereof may be applied to a substrate using a plasma spray coating method. As per claims 5 and 20, Kowalsky teaches applying a coating composition onto a surface by providing a plasma generating gas (e.g. argon, nitrogen, hydrogen, and compressed air as per claims 6 and 8) and the coating composition to a plasma torch/gun at a high temperature of 8,000-12,000°F (within the claimed temperature range of claims 7 and 21), whereby the resulting plasma spray is directed to the substrate (col. 2, line 66-col. 3, line 15; col. 6, line 45-col. 7, line 16). The advantage of utilizing Kowalsky's plasma spray method is that materials of a wide range of particle sizes may be deposited with high velocity (col. 4, lines 28-31). Choi teaches that it was known in the art at the time of the invention to utilize a plasma spray process to deposit a coating composition layer on a roughened component for semiconductor processing (col. 3, lines 38-50; col. 4, lines 1-6). Therefore, one having ordinary skill in the art at the time of the invention,

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motivated by Choi, would have utilized Kowalsky's plasma spray process in Gorczyca's method in order to apply coating materials of a wide range of particle sizes on a roughened surface at velocity sufficient to form a layer of said materials.

Response to Arguments

9. Applicant's arguments filed October 27, 2008 have been fully considered but they are not persuasive. Applicants argue that the Gorczyca et al. (US 2002/0094686) does not teach or fairly suggest applying a dielectric coating composition onto a roughened surface for subsequent use in semiconductor processing. The examiner respectfully disagrees. Gorczyca teaches a semiconductor processing article that is characterized by extended useful life wherein a layer of silicon is deposited on a roughened substrate and converted to silicon oxide in order to fill/cover the trenches/microfissures on the substrate [0022]-[0023]. Although the Gorczyca reference includes an additional step of depositing silicon onto the roughened substrate surface, the "comprising" language of claim 1 does not preclude the additional step of applying the silicon layer prior to the conversion to silicon oxide. In addition, Gorczyca teaches the trench filling process as a pre-treating process **prior** to use in a LPCVD furnace (e.g. subsequent semiconductor processing) [0016],[0034].

Applicants further argue the combination of Gorczyca and Choi et al. (US 6,833,279). However, Gorczyca and Choi are analogous art because they are from the same field of endeavor: preparing/repairing components for **subsequent semiconductor processing steps**. Furthermore, it has been held that the test for

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obviousness is not whether the features of one reference may be incorporated into the other to produce the claimed subject matter but simply what the combination of references makes obvious to one of ordinary skill in the pertinent art. *Consult In re Bozek, 163 USPQ 545 (CCPA 1969).*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis P. Smith whose telephone number is (571) 270-3717. The examiner can normally be reached on Monday through Thursday 7:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mikhail Kornakov can be reached on (571) 272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/F. P. S./
Examiner, Art Unit 1792
/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792